WATER SUPPLY

ISSUES

Residents of Fairfax County receive public water service from one of three water agencies: Fairfax County Water Authority, City of Fairfax Department of Transit and Utilities, and the Falls Church Department of Public Utilities. (The Towns of Vienna and Herndon, while operating their own water distribution systems, purchase water from the City of Falls Church and the Fairfax County Water Authority, respectively. In terms of building major capital facilities to meet water supply needs, the towns are dependent on these two water agencies.) Using recent estimated averages, the Fairfax County Water Authority serves seventy-nine percent of Fairfax County residents, Falls Church serves thirteen percent, the City of Fairfax one percent, and the remaining seven percent of the residents receive water from their own individual wells.

While Fairfax County has neither direct administrative nor budgetary control over water suppliers, the importance of water facilities to County planning is recognized. The Board of Supervisors has entered into an agreement with the Fairfax County Water Authority, which requires Board approval of all capital projects undertaken by the Water Authority. The Fairfax County Water Authority projects included in this CIP represent a program guided by the objectives of the Comprehensive Plan and endorsed by the Board of Supervisors. In the interest of providing a complete picture to the citizens of Fairfax County, the independent CIPs of Falls Church and Fairfax City are also presented. Inclusion in this document represents neither concurrence nor approval of Fairfax County of the individual projects proposed by Falls Church or Fairfax City. They are presented for information purposes only.

Fairfax County Water Authority

Sources of Water: Principal sources of water are the Occoquan Reservoir and the Potomac River. Supplementary sources of water include 2 public well systems and purchased water from the Cities of Fairfax and Falls Church, Town of Vienna, Loudoun County, and Arlington County.

Occoquan: The Occoquan Reservoir is impounded by two gravity-type concrete dams across the Occoquan River, a few miles upstream of its confluence with the Potomac River. The low-level dam was constructed in 1950 and the high-level dam was constructed about 3,000 feet further upstream in 1957. The drainage area of the Occoquan River above the dam is approximately 595 square miles. The dam impounds about 8.3 billion gallons of water. The reservoir, when filled to the crest of the dam at Elevation 122 feet, mean sea level, has a surface area of about 1,840 acres. The present Occoquan River supply has a safe yield of about 72 MGD (million gallons per day).

Potomac: The Potomac River Source of supply has its raw water intake located near Sugarland Run at Lowes Island in Loudoun County. The Potomac River at the Authority intake is not impounded.

Treatment Facilities

Occoquan: Treatment of water is provided at three interconnected plants which have a combined certified (Virginia Department of Health) peak capacity of 112 MGD. The Occoquan Treatment Plant, located on the south side of the River, was placed in service in 1964. The Lorton Treatment Plants, located on the north side of the River, were placed in service in 1951 and in 1973.

Facilities are available for applying various chemicals for coagulation, the control of taste and odors, fluoridation, and disinfection. The plants contain seven treated water reservoirs with total capacity of about 7.5 MG (million gallons). Water is pumped from those reservoirs to the transmission and distribution system.

One 24-inch, two 30-inch and three 36-inch diameter water mains transmit water from the treatment plants at Lorton and Occoquan to the distribution system, and to Prince William County.

Construction of the Griffith Treatment Plant began during 2000. The Griffith Treatment Plant will replace existing Lorton and Occoquan Treatment Plants.

Potomac: Construction of the intake structure, raw water pumping station and initial phase of the Corbalis Treatment Plant commenced in 1978 and was placed into operation in 1982. A major plant expansion was begun in 1992 and completed in 1995. The Corbalis Treatment Plant is authorized by the Virginia Department of Health to operate at a filtration rate of 150 MGD.

Facilities are available for applying various chemicals for coagulation, control of taste and odors, fluoridation, and disinfection. The plant contains two treated water reservoirs from which water is pumped to the transmission and distribution system. These reservoirs have a total storage capacity of 13.5 MG.

Several pipelines transmit water from the Corbalis Treatment Plant to the distribution system including one 48-inch diameter and one 30-inch diameter prestressed concrete pipelines, and one 54-inch diameter steel pipeline. A 36-inch diameter ductile iron pipeline is used to supply the Loudoun County Sanitation Authority.

Pumping Stations: Twenty-nine booster pumping stations are located within the distribution system to provide adequate pressure throughout the Authority's service area. These stations are normally unattended. While the smaller capacity stations operate automatically, the larger stations operate by remote control from the treatment plants.

System Storage: A total of 42 MG of distribution system storage is provided at 31 locations throughout Fairfax County. Principal facilities include 10 MG in two steel ground storage tanks at Fox Mill; 9 MG in three steel standpipes near Annandale; 7.5 MG in three steel ground storage tanks at Gum Springs; 6.7 MG in four steel standpipes and 2 MG in an elevated steel tank at Penderwood; 4.5 MG in two concrete ground storage tanks at Tysons Corner; and 1 MG in an elevated steel tank at Fairfax Hospital.

Transmission and Distribution Facilities: There are approximately 3,009 miles of water main up to fifty-four inches in diameter in the system. The distribution system is interconnected at 76 locations with 12 other water systems in northern Virginia.

City of Fairfax Department of Transit and Utilities

Sources of Water: Fairfax City owns and maintains two water reservoirs in Loudoun County. They are two miles apart and are located about seven miles northwest of Sterling Park. Goose Creek Reservoir holds about 200 million gallons (MG). Beaverdam Creek Reservoir impounds about 1.3 billion gallons. Beaverdam Reservoir ensures the City a four-month supply against drought and low flow in Goose Creek.

Treatment Facilities: The City's treatment plant is located at Goose Creek; its capacity is twelve million gallons per day (MGD).

Pumping Stations: The City has a pumping station located at Goose Creek which delivers water to the transmission and distribution system.

System Storage: Three storage tanks (nine MG total) are maintained in the City to equalize water pressure.

Transmission Facilities: The City's water transmission line runs twenty-two miles from Goose Creek to the City of Fairfax along the abandoned W&OD railroad right-of-way and parallels Hunter Mill Road.

Falls Church Department of Public Utilities

Sources of Water: Falls Church buys treated water from the U.S. Corps of Engineers via a 36-inch connection to the Dalecarlia Filter Plant located on MacArthur Boulevard in the District of Columbia. The Corps obtains its raw water from the Potomac River at Great Falls.

Treatment Facilities: None.

System Capacity: The Falls Church Water System has a current system capacity of 30 MGD, with ultimate capability of 45 MGD.

Pumping Stations: The Falls Church Water System consists of the main pumping station at Chain Bridge and five booster pumping stations.

System Storage: The system includes nine storage facilities with a total capacity of approximately eleven MG.

Transmission and Distribution Facilities: The overall system consists of approximately 440 miles of pipe ranging from four inches to forty-two inches.

PROGRAM GOALS

The primary goal of the Water Supply program is :

- To provide the facilities to treat, transmit, and distribute a safe and adequate potable water supply.

RECENT PROGRAM ACTIVITY

Consistent with the primary goal of the County's Water Supply Program, the Fairfax County Water Authority recently completed the following projects:

- Addition of ozone generation and application facilities at the Corbalis treatment plant
- Improvements to various mechanical and electrical systems at the Potomac Raw Water Pumping Station
- Construction of various Transmission Mains
  - Corbalis to Fox Mill (Phase I)
  - Fox Mill to Vale Road (Phase I)
  - High Service Main No. 3 Replacement (Lorton to Rolling Road)

CURRENT PROGRAM SUMMARY

Development of the Fairfax County Water Authority's supply, treatment, transmission, and distribution facilities is conducted in accordance with a ten year Capital Improvement Program. Highlights of the current program include:

- Construction of the new F. P. Griffith Water Treatment Plant – When completed in 2003, this facility will utilize state-of-the-art treatment techniques capable of meeting the newly adopted water quality requirements of the Safe Drinking Water Act.
- Capacity development at the Corbalis Water Treatment Plant – Additional production capacity is needed to satisfy projected demand for water within the Authority's service area. Yield limitations on the Occoquan Reservoir dictate this next capacity increment be developed at the Corbalis treatment facilities on the Potomac River.
- Creation of a consolidated laboratory – A sophisticated new laboratory for the analysis of all source and finished water is planned at Corbalis. Laboratory improvements are necessary to achieve water quality objectives and demonstrate compliance with drinking water regulations.
- Construction of various Transmission Mains
  - Corbalis to Fox Mill Water Main (Phase II)
  - Stringfellow Road Water Main
  - Route 50 Water Main
  - Potomac/Occoquan Interchange – Pohick Water Main
- Implementation of a Supervisory Control And Data Acquisition (SCADA) system – By providing remote monitoring and control capability, SCADA will promote more efficient system performance during both routine and alternative operations.
- Watershed Management Activities – The Authority continues to advocate watershed protection through the following projects and programs:
  - Support of the Occoquan Watershed Monitoring Program and the Occoquan Nonpoint Source Program
  - Study of critical watershed areas
  - Increased involvement in watershed and water quality issues
  - Analysis of ongoing activities in the watershed.

Additional information can be found in the Authority's 2002 ten year Capital Improvement Program, which is available directly from the Fairfax County Water Authority.

The Water Supply element includes projects of the Fairfax County Water Authority (13 projects) and the Falls Church Department of Public Utilities (5 projects). Total funding is $679.209 million, all from systems revenues and revenue bonds. No new projects are anticipated by the City of Fairfax.

PROJECT DESCRIPTIONS

Fairfax County Water Authority

1. **General and Administrative.** $48,190,000 (estimated total project cost for FY2003-2011) for annual expenses attributed to administration and overhead. These expenses include materials and supplies; refund of advances; and costs associated with net revenue funded projects, but not attributed to a single project or program.

2. **Subdivision & Other Development Projects.** $8,415,000 (estimated total project cost for FY2003-2011) for annual expenses attributed to the review and approval of plans for water main installation associated with land development activities. This project also includes provisions for FCWA inspection of water mains installed by land development contractors.

3. **Extraordinary Maintenance and Repairs**. $58,876,000 (estimated total project cost for FY 2003-2011) for extraordinary maintenance and major repair of supply, treatment, transmission, distribution and general plant facilities associated with a specific project.

4. **Additions and Extensions and Betterments**. $52,667,000 (estimated total project cost for FY 2003-2011) for improvement and betterment of existing supply, treatment, transmission, distribution and general plant facilities associated with a specific project.

5. **General Studies and Programs.** $11,689,000 (estimated total project for FY 2003-2011) for general studies, programs, engineering and research pertaining to water quality, water supply, ~~and~~ system development, and energy management.

6. **Supply Facilities**. $16,175,000 (estimated total project cost) for construction of an offshore intake and 108-inch diameter raw water conduit for the Authority's Potomac River facilities.

7. **Treatment Facilities**. $203,522,000 (estimated total project cost) for the future 120 MGD Griffith Water Treatment Plant on the Occoquan Reservoir. Costs also include process modifications and the construction of a consolidated water analysis laboratory at the Potomac Treatment facilities.

8. **Transmission Facilities**. $32,965,000 (estimated total project cost) for the design and construction of various transmission facilities throughout Fairfax County. Water Main projects include the High Service No. 3 Water Main Replacement and the Pohick Water Main. Other projects include various pumping station modifications and the transmission SCADA system.

9. **Distribution Facilities.** $2,643,000 (estimated total project cost) for the design and construction of additional distribution facilities to replace inadequate well systems in eastern and northern Fairfax County.

10. **General Plant Facilities.** $14,010,000 (estimated total project cost) for annual expenses attributed to administration, overhead, and bond financing for projects funded by current bond issue, future bond issue, or funds on hand.

11. **Potomac Stage III Treatment Facilities.** $124,000,000 (estimated total project cost) for the design and construction of the next production capacity increment at the Corbalis Water Treatment Plant.

12. **Potomac Stage III Transmission Facilities.** $65,763,000 (estimated total project cost) for the design and construction of various transmission facilities primarily associated with development of the Potomac River Water Supply Facilities. Water main projects include the Corbalis-Fox Mill Water Main, Fox Mill-Vale Road Water Main, Hunter Mill Water Main, and the Stringfellow Road Water Main. Additional projects include associated storage facilities.

13. **Potomac Stage III General Plant Facilities.** $23,590,000 (estimated total project cost) for annual expense attributed to administration, overhead, and bond financing associated with development of the Potomac River Water Supply Facilities funded by future bond issue and funds on hand.

Falls Church Department of Public Utilities

1. **Tysons Corner System Improvement**. $5,707,000 to improve the water pressure, fire protection, and storage capacity in the Tysons Corner area. The existing 1.6 MG Tysons Tank will be removed and a new 2.2 MG tank will be built at the same location. Scotts Run and George Mason pumping stations will be upgraded. An addition of an underground booster pumping station at the Dunn Loring site will be constructed. New water main along Gallows Road and one pressure reducing station to lower the pressure, which is now over 100psi in the Fairfax Circle area, will be installed.

2. **Second River Crossing Transmission Main**. $9,000,000 to install a parallel transmission main from the Washington Aqueduct Treatment Plant and the City's Chain Bridge main pumping station.

3. **Seven Corners System Improvement**. $387,000 for a feasibility study to address low pressure and inadequate fire protection issues at Seven Corners.

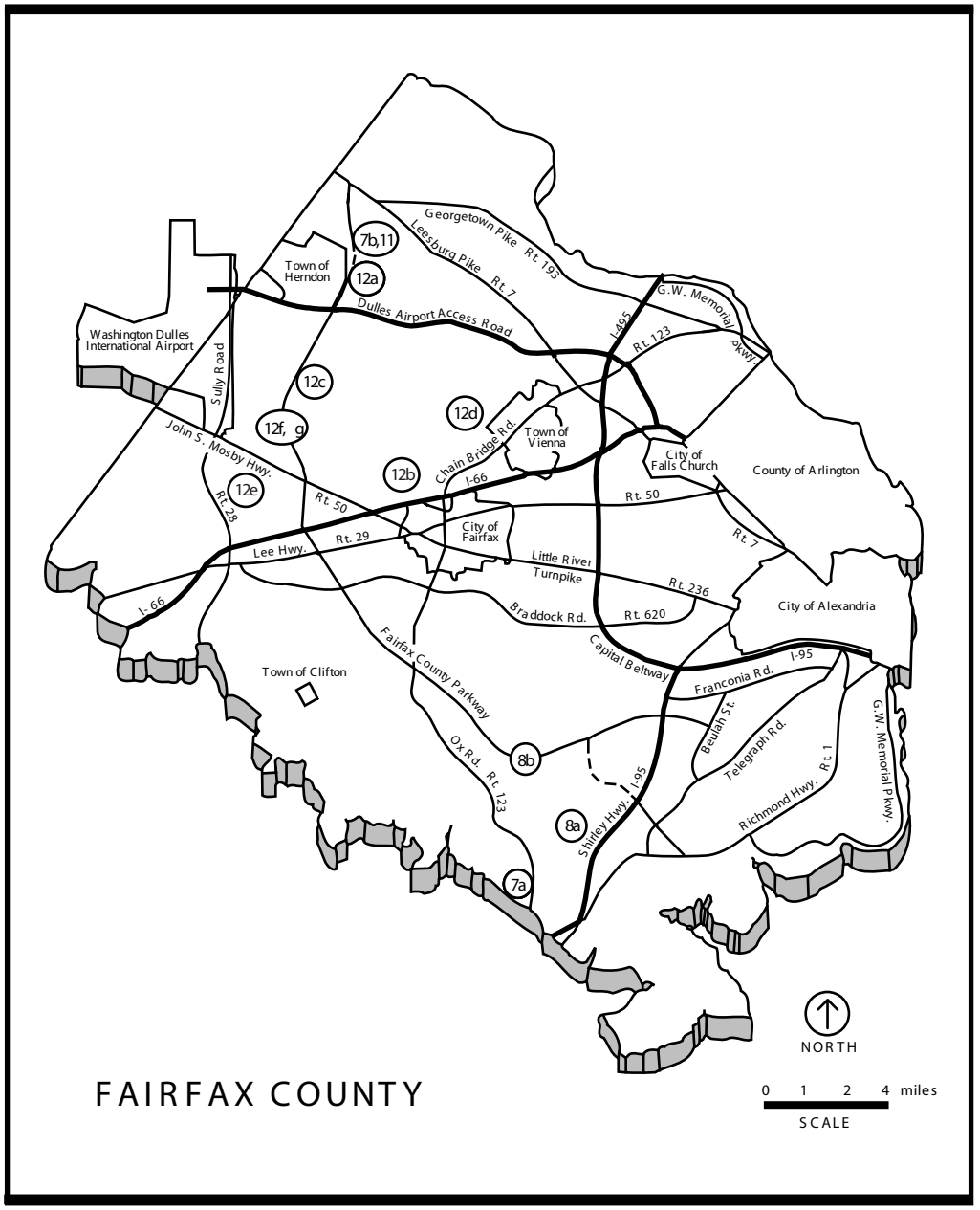
4. **McLean Pumping Station Improvement**. $600,000 to upgrade the McLean Pumping Station from 10.0 MGD to 13.0 MGD to meet the future demand of customers.

5. **Water System Safety & Security Enhancements.** $1,000,000 to evaluate the safety and security of the City of Falls Church water distribution system in light of recent terrorist events and to implement additional safety and security enhancements to the City's water assets.

Water Supply

(Fairfax County Water Authority Projects)

7. Treatment Facilities
   - 7a. F.P. Griffith Water Treatment Plant
   - 7b. Centralized Laboratory and Visitor Education Center
8. Transmission Facilities
   - 8a. High Service No. 3 Replacement
   - 8b. Pohick Water Main
11. Potomac Stage III Treatment Facilities
12. Potomac Stage III Transmission Facilities
   - 12a. Corbalis - Fox Mill Water Main
   - 12b. Waples Mill to Vale Road Water Main
   - 12c. Fox Mill - Vale Road Water Main
   - 12d. Hunter Mill Road Water Main
   - 12e. Stringfellow Road Water Main
   - 12f. Route 50 Water Main
   - 12g. Chantilly Water Main



PROJECT COST SUMMARIES
FAIRFAX COUNTY WATER AUTHORITY
($000's)

PROJECT TITLE (FUNDING SOURCE)/1	TOTAL PROJECT COST	AUTHORIZED/ EXPENDED THRU FY2002/2	FY2003	FY2004	FY2005	FY2006	FY2007	TOTAL FY2003-FY2007	TOTAL FY2008-FY2012/3	ADDITIONAL NEEDED
Net Revenue Projects										
1. General and Administrative	$48,190	/4	$2,200	$1,630	$1,740	$2,700	$7,430	$15,700	$32,490	/4
2. Subdivision and Other Development Projects	8,415	/4	895	905	915	925	935	4,575	3,840	/4
3. Extraordinary Maintenance and Repairs	58,876	/4	8,401	5,878	6,041	5,969	6,294	32,583	26,293	/4
4. Additions, Extensions and Betterments	52,677	/4	7,944	6,341	5,402	5,384	5,324	30,395	22,282	/4
5. General Studies & Programs	11,689	/4	3,497	1,218	938	955	975	7,583	4,106	/4
SUBTOTAL	179,847		22,937	15,972	15,036	15,933	20,958	90,836	89,011	
Current Bond Issue, Future Bond Issue, or Funds on Hand										
6. Supply Facilities	16,175	15,475	700					700		
7. Treatment Facilities	203,522	151,990	34,796	10,826	4,890	1,020		51,532		
8. Transmission Facilities	32,965	16,692	7,075	5,331	2,450	817	600	16,273		
9. Distribution Facilities	2,643	1,335	1,308					1,308		
10. General Plant Facilities	14,010	5,520	4,160	1,650	770	460	720	7,760	730	
SUBTOTAL	269,315	191,012	48,039	17,807	8,110	2,297	1,320	77,573	730	
Future Bond Issue or Funds on Hand										
11. Potomac Stage III Treatment Facilities	124,000	6,000	16,000	40,000	40,000	22,000		118,000		
12. Potomac Stage III Transmission Facilities	65,763	13,275	4,800	11,840	12,148	7,350	1,200	37,338	6,050	9,100
13. Potomac Stage III General Plant Facilities	23,590	620	2,340	5,210	6,370	5,520	630	20,070	2,900	
SUBTOTAL	213,353	19,895	23,140	57,050	58,518	34,870	1,830	175,408	8,950	9,100
GRAND TOTAL	$662,515	$210,907	$94,116	$90,829	$81,664	$53,100	$24,108	$343,817	$98,691	$9,100

FALLS CHURCH DEPARTMENT OF PUBLIC UTILITIES

5 Water Projects/5	$16,694		$8,094	$4,600	$4,000			$16,694		

/1 City of Falls Church projects are funded with system revenues.
/2 Prior expenditures include cost estimates through December 31, 2002.
/3 FCWA expenditures through FY2011 included; FY2012 expenditures are not available.
/4 This is a continuing project. Prior and future expenditures are not provided.
/5 See project descriptions in the Water Supply section narrative.